CENTRAL INTELLIGENCE AGENCY

# INFORMATION REPORT



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| COUNTRY | Czechoslovakia | REPORT | 25X1 |
| SUBJECT | Engines for Arado and Komar Airplanes Produced in Trencin-Kubra | DATE DISTR. | 13 April 1955 |
| | | NO. OF PAGES | 3 |
| DATE OF INFO. | | REQUIREMENT NO. | RD 25X1 |
| PLACE ACQUIRED | | REFERENCES | |

This is UNEVALUATED Information

THE SOURCE EVALUATIONS IN THIS REPORT ARE DEFINITIVE.
THE APPRAISAL OF CONTENT IS TENTATIVE.
(FOR KEY SEE REVERSE)

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1. National Enterprise No. 98sin Trencin-Kubra (N 48-53, E 18-03), which used to be called the Kubra Machine Plant, has been mass-producing gasoline engines for airplanes since 1951.[1] These engines are for Arado and Komar single-engined Czechoslovak airplanes. The production schedule for 1953 called for 1,200 engines, but only 960 were built. Of this number, 3.5 percent were rejects, thus giving a total production of 930 engines.

2. This engine has six cylinders in line. Maximum output is 300 horsepower at 3,500 revolutions per minute, with compressor. Normal output is 150 horsepower at 2,500 revolutions per minute. The engine is considered to be of average quality. The bore is 90 millimeters; that is, the area of the cylinder (head) is 60 square centimeters. The stroke of the cylinder is 140 millimeters, and the volume is 850 cubic centimeters. The over-all volume is 510 cubic centimeters. The average pressure on the cylinders is obtained with the formula:

$$pi \frac{60 \cdot 75 \cdot Ni \cdot 45}{F \cdot s \cdot n \quad 8.4} = 5.3$$

In other words, there is an average pressure per piston of 5.3 kilograms per square centimeter, which is excellent for long periods of operation.

3. The cylinders and the engine block are constructed of a special aluminum and magnesium alloy which has a resistance equal to 45 kilograms per square millimeter. The cooling vanes of the cylinders have been turned and finished with precision. The head of the cylinder is also constructed of the same alloy and is well finished. The ignition chamber is spherical according to the Riccardo system. The cylinder lining is constructed of hard metal, with a chromed and polished surface.

4. The pistons are constructed of aluminum alloy according to the Elektron system. They have been ground conically; the upper diameter is 0.006



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millimeters less than the lower diameter. The upper part of the head of the piston is surrounded by three expansion rings; the lower part of the piston head has a lubrication ring. The piston pin is made of Victrix special steel; it is hollow and locked at each side to two spring rings. The lubrication takes place automatically through the hollow connecting rod. The top valves are made of a special Poldi X steel and are operated by a single shaft.

5. The crankshaft is made of the best Poldi Victrix special steel, with a resistance of 125 kilograms per square millimeter. The crankshaft is divided into six sections. The crankshaft and the connecting rods have bronze gaskets running in colloidal graphite diffused in a special oil. The pressure on the bearings of the crankshaft does not exceed 120 kilograms per square centimeter. The lubrication takes place by means of an oil pressure pump, producing a pressure of 150 kilograms per square centimeter, and assures a relatively long life to the engine.

6. Each cylinder has two spark plugs. One is connected to the induction coil, while the second is connected to the magneto which is equipped with permanent magnets in the form of horseshces according to the Bosch system. The ignition takes place by means of Czechoslovak spark plugs, with radial electrodes of steel and rustproof nickel chrome, which remains constant even in extremes of temperature.

7. The starter also acts as a dynamo for generating electricity and is connected to a battery. This connection is an entirely new conception, resulting from modification and improvements on the Prany system. The carburetor does not have any floating chamber, and the gasoline is fed into it by means of a rotary pump. Therefore, a carburetor of this type can operate in any position, even, for example, with the engine upside down.

8. The gearbox of the crankshaft does not have any oil. The lubricant, which is held in a special tank, is circulated by means of a pump developing a pressure of 120 to 150 kilograms per square centimeter, and it reaches all the friction points that have to be lubricated. The propeller pin is located in the forward part of the engine and has a "labyrinth" gasket with the gear box of the crankshaft. This gasket has a felt filter. The pin has 12 longitudinal grooves which make it possible to change the propeller quickly.

9. For high-altitude flying, the engine is equipped with a four-stroke centrifugal supercharger. It can generate a compression of two atmospheres in a rarification of air equal to 550 millimeters on the mercury column; that is, at an altitude of 5,000 meters above sea level. The cylinders have 17 cooling vanes, arranged along the longitudinal axis of the cylinder which is 2.7 millimeters thick. The diameter of the vanes decreases from the outside toward the engine block; the development of the outside vane to that of the inside vane is in the proportion of 6 to 1. The maximum temperature of the outside of the cylinders does not exceed 90 degrees Celsius.

10. The engine is mounted on the airplane on three rubber supports, along three sections of the axis of the crankshaft. For this reason, the engine block has three special devices within the gear box of the crankshaft. The rubber supports hold the engine steady both on the lower and upper surfaces, so that the entire setup becomes elastic, even when the critical number of revolutions per minute is reached in slow flying or gliding.

11. The fuel used for this engine is aviation gasoline with a high octane number equal to 76-82, enriched with 0.75 to 1.0 percent of antiknock substance.

12. In view of the fact that the compression ratio has been chosen relatively low (1:7.6), the engine runs quietly without strong vibrations. The critical number of revolutions for cruising or gliding is between 750 and 800 revolutions per minute, while for higher speed it is from 3,350 to 3,450 revolutions per minute.

13. The production methods are completely modern. The aluminum blocks are worked by special drills with six interchangeable bits. After the internal steel lining has been applied, the cylinders are once again tested and corrected. The new process also makes it possible to clean the internal chromed walls with rapidity.

1. [redacted] Comment: The reference is probably to the 9th of May Machinery Works (Strojarne 9. maja), National Enterprise, in Trencin-Kubra. 25X1

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